Forest Health Protection

Pacific Southwest Region

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Subject: Tree Survey of Lytle Creek Ranger Station

On February 3, 2009, Paul Zambino and Tom Coleman visited the Lytle Creek Ranger Station to assess high-value trees following initial concern from Henry Herrera.

Two Monterey x knobcone pines (*Pinus radiata x attenuata*) adjacent to the main entrance require pruning and removal to reduce hazard to surrounding structures and high foot traffic areas. The pine directly adjacent to the gate for the employee entrance requires immediate removal. One main branch extending toward the gate is structurally unsound, with a shear crack that passes entirely through the branch (Fig. 1). This type of crack readily flexes and will "run" when stressed further in the wind. It cannot heal, and has a high risk of failure.

Figure 1. Branch of Monterey x knobcone pine that should be pruned because of cracking and surrounding.

Figure 2. Monterey x knobcone pine that should be removed because main stem is leaning >30%.

Up until now there is no evidence that the roots of this tree have begun to fail, as would be indicated by root heaving on the side away from the direction that the tree is leaning. But the stress will increase when the branch with the split is removed. As soon as this branch is pruned, it will add to the stress already being exerted on the main bole. The main bole is leaning >30% from a vertical orientation (Fig. 2). In high-use and urban areas, any tree with a main stem leaning >30% should be felled to reduce potential hazards. The hazard is more extreme for this tree, as there are additional large branches that sprawl in the direction of the lean, so the center of gravity is even more severely shifted. It may be prudent to remove some of these low-lying branches before removing the split branch on the day that the tree is felled.

The second Monterey x knobcone pine immediately next to the previous pine requires additional pruning. Following previous events of pruning and branch breakage from high wind, *Ips* spp. engraver bark beetles are successfully attacking the upper portion of the main bole and lateral branches (Fig 3.). Red pitch tubes and bark sloughing are evident in these areas. Dead branches and branches showing red pitch tubes should be pruned. The bole should be topped again to prevent stem breakage in the high-use area. *Ips* spp. engraver bark beetles may continue to attack the tree after the dead branches have been removed due to additional stress from pruning and volatiles emitting from the tree. However, the high-value tree can possibly survive and does not require immediate felling. Much of the crown is not infested by bark beetles. Insecticide application can be used to save the remaining portion of the tree, but may not be necessary. *Ips* spp. populations commonly diminish after a couple of years, and pruning may remove bark beetle populations. The surrounding pines are not under significant threat to warrant management. No additional significant insect threats were found around the ranger station.

Figure 3. Monterey x knobcone pine with *Ips* sp. engraver bark beetle attacks at the top.

Leafy mistletoe was a severe problem in some of the scrub oaks (*Quercus* spp.) across the road from the interpretive area. Trees with over 80 % of the crown infected could be seen next to trees where the parasitic plant was almost lacking. Mistletoe can greatly increase water stress to infected trees, as these plants have greater transpiration per leaf area than their host plants. Hand pruning is suggested for those trees where cutting branches will remove the mistletoe without leaving a large wound on the bole. In trees with multiple main stems, removing a main stem with infections will not be detrimental; it will thin the number of main stems. Care must be taken to cut such stems just outside the callus ring, to leave a small wound with a face perpendicular to the branch axis that will heal rapidly, instead of a long wound parallel to the main bole. Cutting the most severely infected trees all that way to the base will benefit nearby uninfected or lightly infected trees by removing a source of seed of this parasitic plant, as well as improving water availability. Also, there is still potential for heavily infected trees that have been cut to ground level to regenerate from stump or root sprouts, as many scrub oak species are adapted to resprouting after fire.

Topkill, cankering, and mortality was noted in redwoods (*Sequioa sempervirens*) planted behind the office (Fig. 4 and 5). The most exposed trees appeared the most heavily damaged. The most likely explanation is that these trees are doing poorly because they are not adapted to the site. Redwoods prefer wooded, coastal locations, and moist air. They have a shallow rooting zone in undisturbed soil, are not subject to artificial removing of bottom branches.

The most likely explanation for the appearance of the disease is that a combination of abiotic and biotic causes contributed to the topkill and cankering. The two fungi that cause most of the cankering in redwood, *Botryosphaeria dothidea* and *Pezicula livida*, are both favored by water stress, soil compaction,

Figure 4. Redwood with topkill.

and pruning. On some trees, cankers appeared prevalent in the trunk near stubs of branches on some trees. Drought and frost damage, rare along the moist coast, could also have caused top kill in the trees without apparent cankers.

The dead trees should be removed. The living trees could be left to see if they will recover, if they are given supplemental water and foot and equipment traffic is restricted. Mulching may help. Pruning of regrowth should be avoided.

Some of these trees are showing evidence of a flush of abundant growth lower in the bole (Fig. 6). This is a natural strategy of the redwoods' to generate epicormic branches directly from the bark on the main stem and from burls at the root crown. The growth habit of putting out new shoots after tops have been killed and the lower bole has been exposed to sunlight is advantage in nature, and is readily seen in majestic groves of redwoods. This habit can become a problem in populated areas. Branches from epicormic sprouts do not have the deep connections to the heart of the tree found in branches that develop early on from apical growth, are weaker, and can be prone to failure. Given the wind exposure of this site, branches of redwoods on this site that recover should be reexamined in several years to reassess hazard.

Figure 5. Cankering present on the main stem of redwood.

Figure 6. Redwood with epicormic branching.

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